relating to the *rôle* of the nucleus and the chromosomes in development. Another section gives a short account of the chondriosomes, while the final chapter is concerned with the nucleus in the Protista and the nuclear relationships in plants.

The book is well illustrated and excellently produced. While it can scarcely appeal to a wide circle of readers, it will be of great service to all those who wish to be informed concerning the results arising out of the work of the last twenty years on this subject. The cytologist will find it indispensable for reference, and biologists generally will turn to it for the more recent work relating to these problems. R. R. G.

Our Bookshelf.

Aircraft in Peace and the Law. By Dr. J. M. Spaight. Pp. viii + 233. (London: Macmillan and Co., Ltd., 1919.) Price 8*s*. 6*d*. net.

This is a useful attempt to put before the public the main issues of international law relating to the air. In every new development of modern invention, law-making authorities are faced with the difficult task of applying old principles to developments not contemplated when those principles were formulated, and with such a revolutionary departure as the modern aircraft there is a grave risk of deception by a false analogy. The British method has been to apply as far as possible the principles of the Merchant Shipping Acts to aircraft. The idea is lacking in boldness and imagination, for there is little parallel between the two forms of navigation in relation either to the problems of the navigators themselves, or to the rights and liabilities of the public at large. Generally speaking, however, a wise caution has been exercised by those who framed the International Convention. From another point of view the fundamental issue in aerial navigation is the sovereignty of the air, and on this England reserved her opinion. Continental Powers, without exception, clearly realising the serious military problems before them if all comers were allowed unrestricted flight above their territories, maintained in full their dominion in the air above their lands and territorial waters. England, on the other hand, had a different problem to face. No aerial highway of any importance crosses her frontiers in any part of the world, but nearly all the aerial routes which link up her scattered dominions do almost invariably cross the territories of other nations; she ought, therefore, her aerial experts maintained, to hold out for free flight.

It would seem that this view exaggerated the difficulties put in the way of innocent traffic by the maintenance of sovereignty, and minimised the dangers of sudden invasion. We must not forget that the economic interests of Great Britain are just as dependent on military security as they are on theoretical freedom of transport, and therefore Dr. Spaight would seem to be quite correct in urging the maintenance of the doctrine of the sovereignty of the air. Popular panic is a disaster only less serious than actual assault. The book is well arranged and indexed, while the writer's comments on what is as yet almost an untested department of law of exceptional difficulty, are acute, unprejudiced, and well-informed.

W. B. F.

Wireless Telegraphy and Telephony: First Principles, Present Practice, and Testing. By H. M. Dowsett. Pp. xxxi + 331. (London: The Wireless Press, Ltd., 1920.) Price 9*s*.

The object of this work is to provide a connecting link between the various elementary textbooks, intended for those taking up the study of wireless telegraphy, and advanced treatises dealing with particular aspects or branches of the subject. It does not aim at completeness, but usefully develops certain parts of the theory and practice involved. The author insists upon an adequate appreciation of the structure of the atom and the part played by its constituents for a clear understanding of the phenomena met with in wireless working, and puts forward conceptions which, if not presenting a perfectly true scale model of the atom, at any rate are helpful in fixing the ideas. Another theoretical chapter leads up to explanations of some of the methods used in spark and continuous-wave transmission; and perhaps the most important sections of the book deal with the thermo-ionic valve and the modern methods of its employment for both reception and transmission, upon which so much of the recent advances depends. Other developments dealt with are high-speed automatic transmission and direction finding. A considerable portion of the book is devoted to systems of measurement of electrical quantities adapted to wireless telegraph testing. The author concerns himself only with up-to-date methods, and historical matter does not form part of his scheme.

Chimica delle Sostanze Esplosive. By Prof. Michele Giua. Pp. xvi + 557. (Milano: Ulrico Hoepli, 1919.) Price 28 lire.

This treatise is written from the point of view of the laboratory chemist, and contains a very full account of the chemistry of explosive compounds. The author bases his work on that of Berthelot, and develops the theoretical treatment of explosive reactions on thermochemical lines. When dealing with the propagation of explosions through gases, the work of British investigators is practically unnoticed, and although a few references to papers do indeed appear in a table, they are omitted from the index. The treatment of this part of the subject thus appears to be rather superficial. The explosive compounds are described fully, and brief, but clear, accounts are given of the plant used in their manufacture. This section, with its numerous references to the litera-

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ture, should prove of value to the organic chemist, but there is little attempt to compare the relative advantages of the compounds so described as constituents of technical explosives, and a comprehensive review of the whole subject is lacking. A later section contains the compositions of a large number of explosive mixtures, drawn mainly from the patent literature. It may be noted that, whilst many complex mixtures containing ammonium nitrate as their principal constituent are cited, there is no mention of the simple amatol mixtures which were so extensively employed during the war. The closing chapter describes the usual methods of testing explosives, and of performing the analysis of the raw materials and finished products. The illustrations include numerous photomicrographs of crystalline compounds, nitrated fibres, and prepared mixtures.

C. H. D.

Lad: A Dog. By Albert Payson Terhune. Pp. 309. (London and Toronto: J. M. Dent and Sons, Ltd., 1920.) Price 6*s*. net.

THOSE who like dogs will find this tribute very interesting, and will, we think, be able to confirm much of it from personal experience. Those who begin the book with a prejudice in the other direction are, we think, likely to change their position. The story is told enthusiastically, but there is no nonsense about it, and the anthropomorphism is restrained. Some comparative psychologists of the severer sort have said that the fatal thing is a personal interest in the creature observed, and the danger of mingling emotion with inference, and inference with observation, is well known. We might admit this, and yet hold that comparative psychology is likely to be advanced by intimate studies such as Mr. Terhune has given us of "Lad." There may be glimpses of reality to be got in this way which the analytic method does not reveal. In any case, the author has told, in a very delightful way, the story of a charming companion endowed with considerable complexity of character which nurture enhanced. For "Lad" was a "real" dog, and the chief happenings in nearly all the stories about him are "absolutely true." He lived out a full span of sixteen years, and his epitaph reads "Thoroughbred in Body and Soul."

A Theory of the Mechanism of Survival: The Fourth Dimension and its Applications. By W. Whately Smith. Pp. xi+196. (London: Kegan Paul, Trench, Trubner, and Co., Ltd.; New York: E. P. Dutton and Co., 1920.) Price 5*s*. net.

THERE is nothing striking or new in this argument, neither is there anything extravagant in its application. The author expounds in a clear and easy manner the familiar notions of flatland and of a possible fourth dimension, and suggests that a hypothesis is necessary to explain the somewhat doubtful phenomena with which psychical research deals. These notions, he thinks, afford the basis of a hypothesis.

Letters to the Editor.

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London University Site and Needs.

I HAVE been surprised that no word of protest has been raised against the scheme of locating the University of London on a limited plot of land in the centre of the city. If the site were for administration purposes alone, combined, perhaps, with lecture-rooms for those subjects which require no practical instruction, the area offered might be adequate, but could only be rendered suitable for its purpose at such an enormous cost for site, removal of existing buildings, and erection of new edifices, that nothing but the most urgent necessity could justify; nor would the new position be one whit better or more convenient than South Kensington. It is, however, understood that the buildings to be erected are not only for administration purposes and lectures, but also to meet all requirements of the scientific departments.

Now it can be easily shown that provision for scientific subjects will require a far greater area of land than the amount suggested in the Government's offer. For the population of London one thousand would be a moderate estimate for the number of students who might be expected to need instruction in any one of the great departments of science, of which not fewer than twenty would need to be provided. Taking into consideration passages, staircases, preparation rooms, and assistants' rooms, for every working place in any practical department a floor area of at least ten square yards is wanted. Therefore, for each of the twenty subjects not less than ten thousand square yards of floor-space would be necessary. In addition to this, each will require lecture theatres, demonstration rooms, and research rooms; and for this, on a moderate estimate, we must add 50 per cent. to the above figure. This gives a total requirement for the twenty practical departments of not less than fifty acres of floor-space, in addition to the area wanted for administration purposes, libraries, museums, and for the subjects which do not need accommodation for practical work. Unless, therefore, the "skyscraper" system is to be utilised for university buildings, the $11\frac{1}{2}$-acre plot proposed to be given up for the purposes of the University of London is absurdly inadequate, especially since not more than 8 acres of such a site could possibly be covered by actual buildings.

The problem is, however, much more complex than is represented by a mere computation of floor area. Anyone who has experience of a practical department knows the supreme importance of placing it in an entirely separate, self-contained building or institute, thereby allowing abundance of light for all rooms and furnishing space for any necessary future extension. Such institutes cannot be erected on a limited site. They require far more land than can ever be provided in the centre of a town. It is, therefore, certain that a single university adequate for the needs of London cannot be established in the situation proposed by the Government; and it is not too much to assert that its purchase and the cost of erecting buildings upon it would be a most wasteful expenditure, involving at the lowest estimate a total of five millions sterling!

The alternative is to decentralise the teaching by placing several university centres—say four to begin

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